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Renesas Technology Corp.
Customer Support Dept.
April 1, 2003

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Keep safety first in your circuit designs!

1. Renesas Technology Corporation puts the maximum effort into making semiconductor products better and more reliable, but there is always the possibility that trouble may occur with them. Trouble with semiconductors may lead to personal injury, fire or property damage.

Remember to give due consideration to safety when making your circuit designs, with appropriate measures such as (i) placement of substitutive, auxiliary circuits, (ii) use of nonflammable material or (iii) prevention against any malfunction or mishap.

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2SC5828

Silicon NPN Epitaxial
VHF/UHF Wide band amplifier

RENESAS

ADE-208-1465(Z)

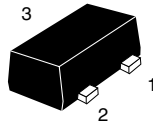
Rev.0
Nov. 2001

Features

- Super compact package: MPAK (1.4 x 0.8 x 0.59 mm)

Outline

MPAK



1. Emitter
2. Base
3. Collector

Note: Marking is "WX-".

Absolute Maximum Ratings

($T_a = 25\text{ }^\circ\text{C}$)

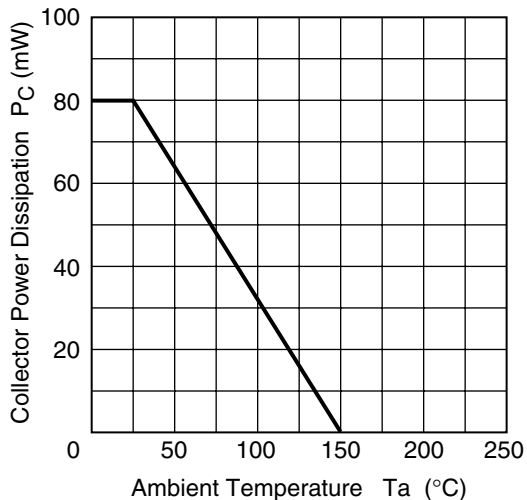
Item	Symbol	Ratings	Unit
Collector to base voltage	V_{CBO}	15	V
Collector to emitter voltage	V_{CEO}	5.5	V
Emitter to base voltage	V_{EBO}	1.5	V
Collector current	I_C	80	mA
Collector power dissipation	P_C	80	mW
Junction temperature	T_j	150	$^\circ\text{C}$
Storage temperature	T_{stg}	-55 to +150	$^\circ\text{C}$

Electrical Characteristics

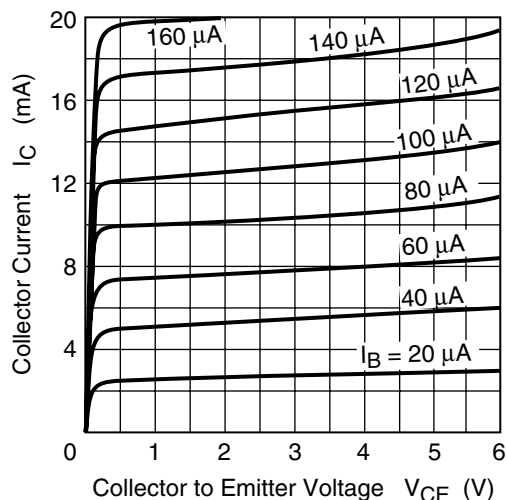
($T_a = 25\text{ }^\circ\text{C}$)

Item	Symbol	Min	Typ	Max	Unit	Test conditions
Collector to base breakdown voltage	$V_{(BR)CBO}$	15	—	—	V	$I_C = 10\text{ }\mu\text{A}$, $I_E = 0$
Collector cutoff current	I_{CBO}	—	—	0.1	μA	$V_{CB} = 15\text{ V}$, $I_E = 0$
Collector cutoff current	I_{CEO}	—	—	1	μA	$V_{CE} = 5.5\text{ V}$, $R_{BE} = \text{Infinite}$
Emitter cutoff current	I_{EBO}	—	—	0.1	μA	$V_{EB} = 1.5\text{ V}$, $I_C = 0$
DC current transfer ratio	h_{FE}	100	120	150	—	$V_{CE} = 1\text{ V}$, $I_C = 5\text{ mA}$
Collector output capacitance	C_{ob}	—	0.85	1.15	pF	$V_{CB} = 1\text{ V}$, $I_E = 0$, $f = 1\text{ MHz}$
Gain bandwidth product	f_T	2.5	5.5	—	GHz	$V_{CE} = 1\text{ V}$, $I_C = 5\text{ mA}$
Power gain	PG	11	14	—	dB	$V_{CE} = 1\text{ V}$, $I_C = 5\text{ mA}$, $f = 900\text{ MHz}$
Noise figure	NF	—	1.0	1.7	dB	$V_{CE} = 1\text{ V}$, $I_C = 5\text{ mA}$, $f = 900\text{ MHz}$

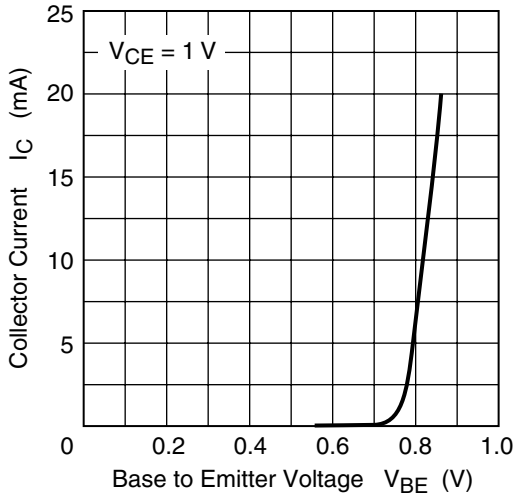
Collector Power Dissipation Curve



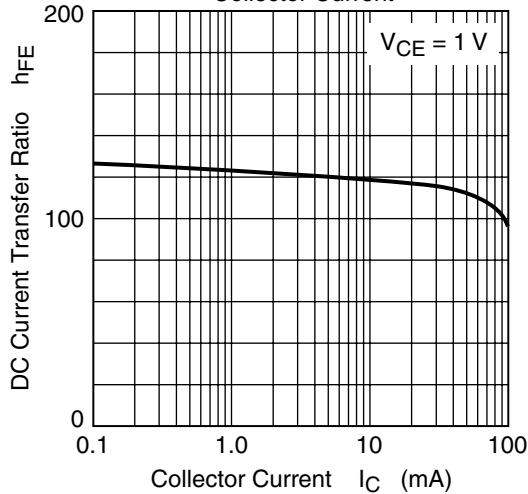
Typical Output Characteristics

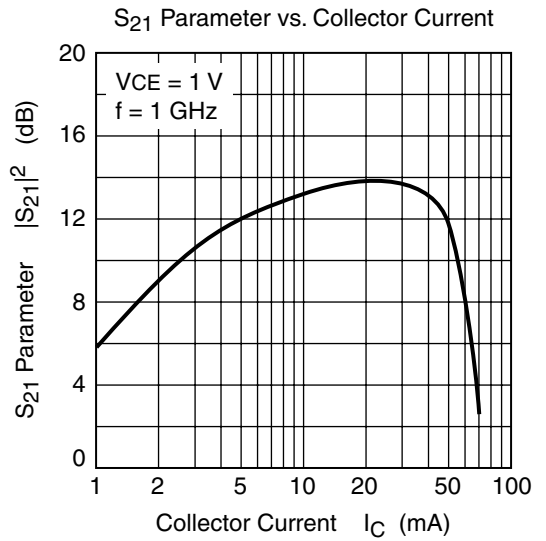
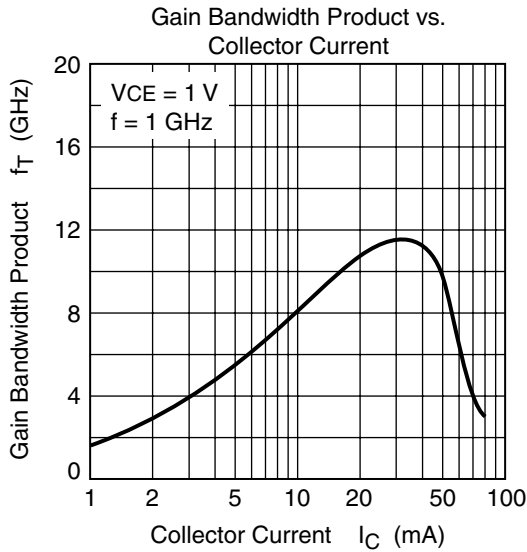
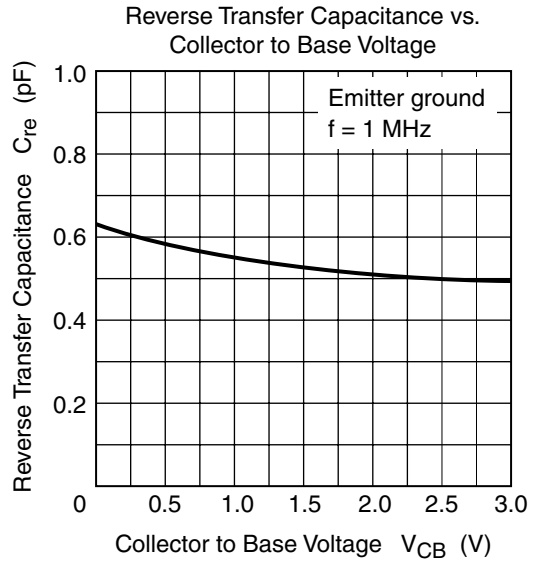
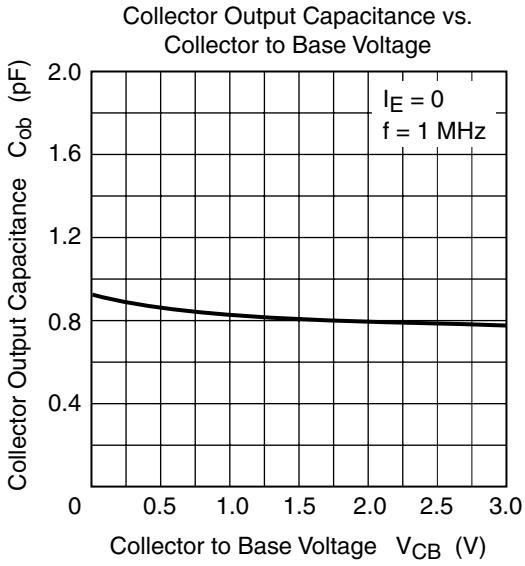


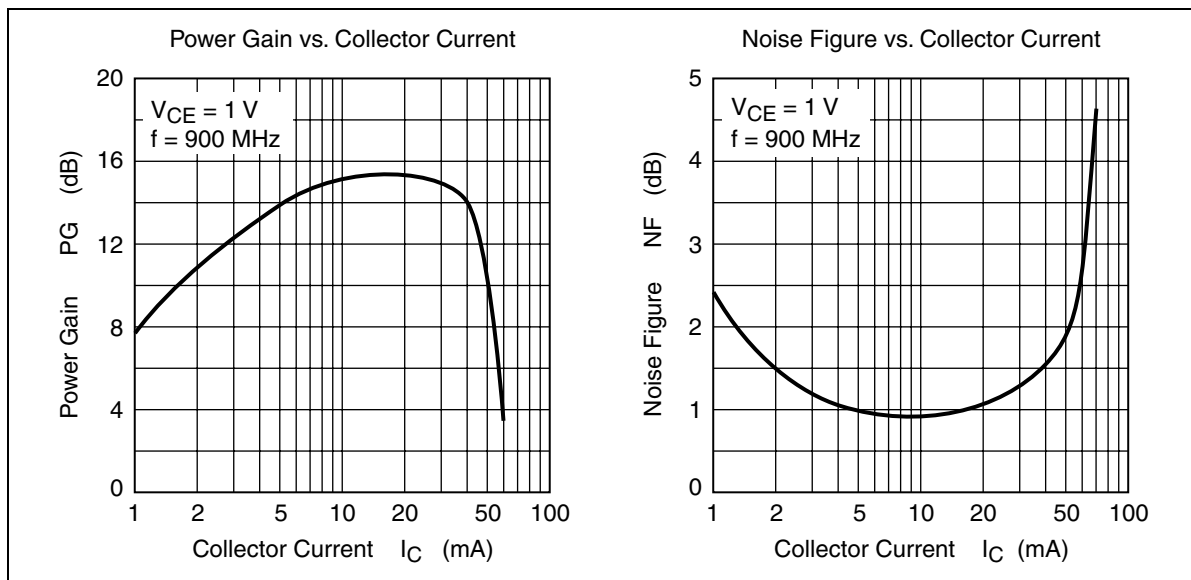
Typical Transfer Characteristics



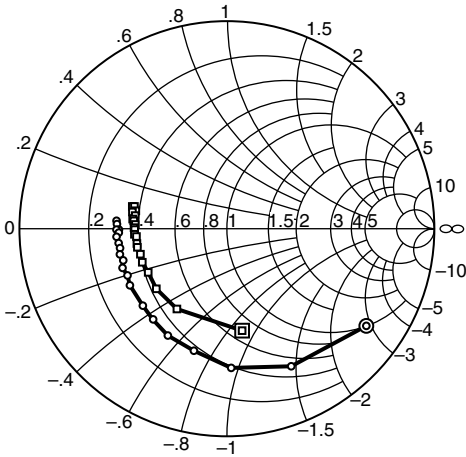
DC Current Transfer Ratio vs. Collector Current





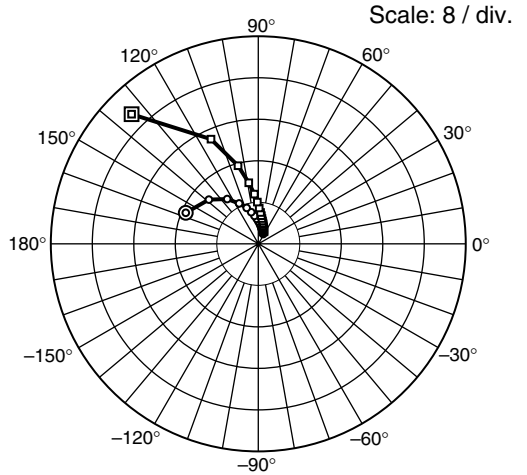


S₁₁ Parameter vs. Frequency



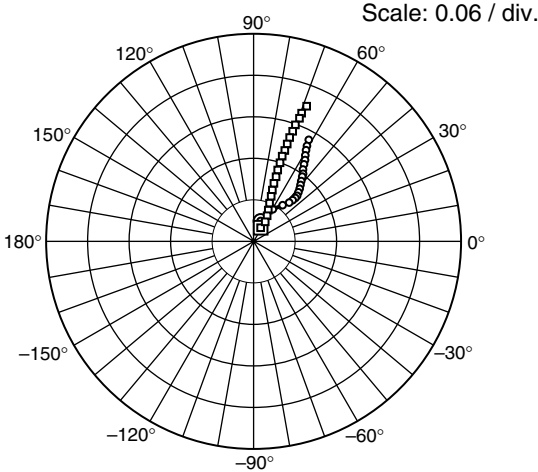
Test conditions: $V_{CE} = 1\text{ V}$, $Z_O = 50\ \Omega$
 100 to 2000 MHz (100 MHz step)
 ○—○ ($I_C = 5\text{ mA}$)
 □—□ ($I_C = 20\text{ mA}$)

S₂₁ Parameter vs. Frequency



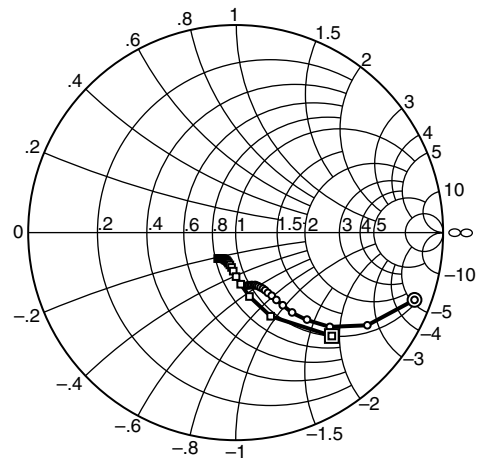
Test conditions: $V_{CE} = 1\text{ V}$, $Z_O = 50\ \Omega$
 100 to 2000 MHz (100 MHz step)
 ○—○ ($I_C = 5\text{ mA}$)
 □—□ ($I_C = 20\text{ mA}$)

S₁₂ Parameter vs. Frequency



Test conditions: $V_{CE} = 1\text{ V}$, $Z_O = 50\ \Omega$
 100 to 2000 MHz (100 MHz step)
 ○—○ ($I_C = 5\text{ mA}$)
 □—□ ($I_C = 20\text{ mA}$)

S₂₂ Parameter vs. Frequency



Test conditions: $V_{CE} = 1\text{ V}$, $Z_O = 50\ \Omega$
 100 to 2000 MHz (100 MHz step)
 ○—○ ($I_C = 5\text{ mA}$)
 □—□ ($I_C = 20\text{ mA}$)

S Parameter $(V_{CE} = 1 \text{ V}, I_C = 5 \text{ mA}, Z_o = 50 \Omega)$

f (MHz)	S11		S21		S12		S22	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
100	0.819	-34.8	15.22	156.8	0.031	71.2	0.921	-20.6
200	0.732	-64.9	12.81	138.1	0.054	59.1	0.776	-35.1
300	0.671	-88.2	10.54	124.7	0.067	51.3	0.642	-45.0
400	0.609	-105.1	8.65	115.3	0.076	47.5	0.542	-50.6
500	0.588	-118.9	7.31	107.9	0.082	46.5	0.471	-54.7
600	0.563	-129.1	6.28	102.6	0.087	46.1	0.417	-57.0
700	0.549	-137.5	5.47	97.8	0.091	46.3	0.379	-58.8
800	0.541	-143.8	4.87	93.6	0.096	47.6	0.350	-60.2
900	0.529	-149.7	4.40	90.2	0.101	48.8	0.329	-61.8
1000	0.537	-154.8	4.01	86.9	0.106	50.3	0.312	-62.9
1100	0.522	-159.4	3.67	84.1	0.111	51.7	0.300	-64.0
1200	0.530	-163.0	3.38	81.1	0.117	53.1	0.290	-65.5
1300	0.523	-166.5	3.15	79.0	0.121	53.8	0.281	-66.9
1400	0.526	-169.7	2.94	76.7	0.126	55.5	0.275	-68.1
1500	0.533	-172.4	2.77	74.1	0.133	56.8	0.269	-69.5
1600	0.521	-175.8	2.61	72.2	0.139	57.7	0.268	-71.0
1700	0.532	-177.9	2.46	70.2	0.145	59.0	0.264	-72.7
1800	0.520	-179.5	2.35	67.9	0.152	60.1	0.263	-74.3
1900	0.530	177.6	2.23	66.0	0.158	60.8	0.261	-76.0
2000	0.533	175.9	2.14	63.9	0.167	61.5	0.261	-77.9

2SC5828

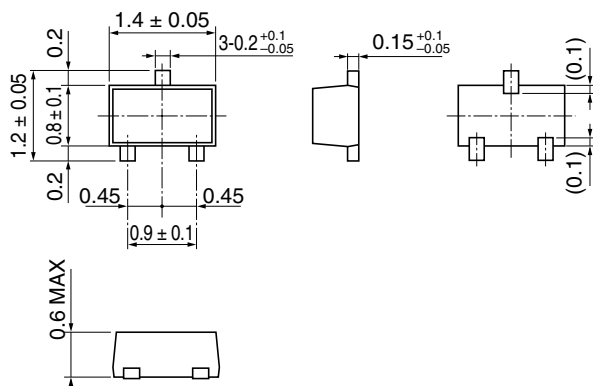
($V_{CE} = 1 \text{ V}$, $I_C = 20 \text{ mA}$, $Z_o = 50 \Omega$)

f (MHz)	S11		S21		S12		S22	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
100	0.496	-81.4	34.91	134.4	0.022	62.9	0.680	-47.1
200	0.455	-121.9	22.12	114.3	0.033	59.6	0.438	-67.3
300	0.446	-139.6	15.54	104.5	0.042	62.4	0.316	-77.8
400	0.433	-151.0	11.90	98.8	0.050	65.0	0.251	-84.4
500	0.438	-158.4	9.60	94.4	0.060	67.5	0.213	-89.4
600	0.434	-163.6	8.04	91.2	0.070	68.8	0.187	-93.5
700	0.440	-168.3	6.91	88.4	0.079	70.0	0.170	-96.6
800	0.439	-170.7	6.05	85.7	0.089	70.8	0.159	-100.0
900	0.437	-175.1	6.45	83.6	0.099	70.9	0.152	-103.1
1000	0.446	-176.6	4.92	81.6	0.109	71.4	0.147	-105.3
1100	0.444	-179.5	4.48	79.3	0.120	71.5	0.143	-107.8
1200	0.447	179.3	4.10	77.1	0.130	71.5	0.142	-110.2
1300	0.441	177.3	3.83	75.7	0.139	71.1	0.140	-112.5
1400	0.450	175.1	3.56	74.0	0.149	71.0	0.140	-114.4
1500	0.456	174.1	3.34	72.0	0.159	70.9	0.141	-116.2
1600	0.446	171.8	3.14	70.5	0.169	70.5	0.143	-117.8
1700	0.462	169.9	2.96	68.8	0.179	70.3	0.145	-119.4
1800	0.447	168.8	2.81	67.2	0.190	69.6	0.148	-121.2
1900	0.458	166.4	2.68	65.8	0.198	69.5	0.150	-122.7
2000	0.468	166.7	2.55	64.1	0.210	68.6	0.153	-124.4

Package Dimensions

As of July, 2001

Unit: mm



Hitachi Code	MFPAK
JEDEC	—
JEITA	—
Mass (reference value)	0.0016 g

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